REMARKS

Applicants respectfully request reconsideration of this application as amended. Claims 1-7, 9-13, and 15-42 remain in this application. Claims 1, 9, 10, 16, 25, 29, 31, and 37 have been amended. No further claims have been added or canceled.

Rejections under 35 U.S.C. § 112

Claims 1-7, 9-13, and 15-42 stand rejected under U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. In particular, the Examiner asserts that the specification does not disclose building paths and states the paragraph 13 of the specification teaches "building and maintain network databases and establishing lightpaths." Applicant respectfully submits that claims 1-7, 9-13, and 15-42, as amended, satisfy 35 U.S.C 112, first paragraph and respectfully requests the withdrawal of the rejection.

Claims 9 and 29 stand rejected under 35 U.S.C 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter Applicant regards as the invention. Claims 9 and 29, as amended, are directed to a centralized network management server that further builds and maintains the set of network topology databases. Applicant respectfully submits that claims 9 and 29, as amended, satisfy 35 U.S.C 112, second paragraph and respectfully requests the withdrawal of the rejection.

Rejections under 35 U.S.C. § 102(a)

Claims 1-5, 10-11, 16-19, 21-22, 24-26, 28, and 30 stand rejected under 35 U.S.C. § 102(a) as being anticipated by Ho et al. ("A Novel Distributed Control Protocol in Dynamic Wavelength-Routed Optical Networks", IEEE Communications Magazine, November 2002). Applicant does not admit that Ho is prior art and reserves the right to swear behind the reference at a later date. Nonetheless, Applicant respectfully submits that Ho does not disclose each and every element of the invention as claimed in claims 1-5, 10-11, 16-19, 21-22, 24-26, 28, and 30.

Ho discloses selecting an optical path for a source node from many available paths to different destination nodes in an optical network (Ho, Abstract, p.38). The source node is provided with a routing table that defines all possible paths to the different destinations nodes (Ho, p.39, 2nd column). The paths of the routing table are defined offline (Ho, p. 39, 2nd column). Assigning the proper path involves selecting the path and selecting the proper wavelength along the path (Ho, p. 38, 1st column). Because all of the routing between the source and destination nodes is predefined in the routing table, path selection just involves wavelength selection (Ho, p. 39, 2nd column). Wavelength selection selects the best lightpath between the source and destination nodes (Ho, p. 39, 2nd column). This is done by determining critical links (i.e. paths with high traffic), and broadcasting to other nodes to avoid the critical links during path selection (Ho, p. 40, 2nd column).

Applicant respectfully submits that Ho does not teach or suggest Applicant's claims. The Examiner equates Applicant's topological database with Ho's routing table and admits that the paths for Ho's routing table are defined offline. Thus, Ho does not teach or suggest that the optical nodes build or maintain a representation of the paths for the routing tables. For example, claim 1, as amended, requires "a plurality of wavelength division multiplexing access nodes of an optical network employing a source based scheme to establish communication paths, each of said plurality of access nodes building and maintaining a set of one or more network topology databases specific to that access node based on a set of one or more connectivity constraints, wherein network topology is the set of paths and wavelengths of possible communication paths from that access node to other nodes, wherein the wavelengths for each path are the set of wavelengths of each link of that path that are available for establishing lightpaths on that path, and wherein said building and maintaining the set of one or more network topology databases includes building and maintaining a representation of the set of paths of possible communication paths."

In addition, claim 10, as amended, requires "a wavelength division multiplexing optical network including a plurality of access nodes each including, for each link connected to the access node, a link channel set representing at least certain wavelengths on that link available for establishing a lightpath, wherein a lightpath is a wavelength and

a path, wherein the path of a given lightpath is a series of two or more nodes and links interconnecting them through which traffic is carried by the wavelength of that lightpath, wherein said series of nodes respectively starts and ends with a source node and a destination node, and a database representing conversion free connectivity for the access node to others of said access nodes using the wavelengths in said link channel sets, wherein the access nodes builds and maintains a representation of the path of the given the lightpath in the database specific to the access node and wherein said conversion free connectivity includes the paths and wavelengths of possible lightpaths having the access node as the source node and others of the access nodes as the destination node."

Furthermore, claim 16, as amended, requires "each of a plurality of access nodes of a wave length division multiplexing optical network, tracking wavelengths for each link of the wave length division multiplexing optical network connected to that access node; each of said plurality of access nodes, building and maintaining a topology based on conversion free connectivity to others of said plurality of said access nodes, wherein the topology of each of said plurality of access nodes is different than others of said plurality of access nodes, and wherein the building and maintaining of the topology includes building and maintaining a set of paths to others of the plurality of access nodes; and responsive to a request for a communication path received by any one of said plurality of access nodes, that access node, selecting both a path through a set of one or more links of said optical network and a single wavelength available on everyone of said set of links based on said optical topology maintained in that access node, and causing allocation of said selected path and wavelength."

Claim 25, as amended, requires "...a database to store a representation of available paths from the access node to others of said access nodes using the wavelengths in said link state database, wherein a path is a series of two or more nodes connected by links on which a common set of one or more wavelengths is available for establishing one or more lightpaths, wherein the database is different than other access nodes to be coupled in the wavelength division multiplexing optical network and wherein the access node builds and maintains the available paths represented in the database ..."

The above quoted limitations are not described or suggested by Ho. While there are various uses for the invention as claimed, several such uses are discussed at

paragraphs 0073-0086 and 0090 of the specification as filed. Thus, while the invention is not limited to the uses discussed on these pages, it should be understood that Ho does not enable these uses and the above quoted limitations do.

For at least these reasons, Applicant respectfully submits that the claims discussed above are allowable. The Applicant respectfully submits that the additional dependant claims are allowable for at least the reason that they are dependent on an allowable independent claim.

Claims 1-5, 9-11, and 15 stand rejected stand rejected under 35 U.S.C. § 102(a) as being anticipated by Blouin et al., U.S. Patent No. 7,249,169. Applicant does not admit that Blouin is prior art and reserves the right to swear behind the reference at a later date. Nonetheless, Applicant respectfully submits that Blouin does not disclose each and every element of the invention as claimed in claims 1-5, 9-11, and 15.

Blouin discloses a mixed network of edge nodes communicating with other edge nodes across a core optical network formed by a set of core nodes (Blouin, Figure 2, col. 6, lines 15-34). Each of the edge nodes is an electronic packet switch or router with optical interfaces (Blouin, *Id.*). The edge nodes communicate with other edge node across the optical network using pre-defined route-sets (Blouin, Figure 4, col. 9, lines 31-36). The route-sets are used for electrical routing, because the route-sets comprise only routes between the edges nodes and do not include optical routes between the core nodes (Blouin, Figure 3; col. 8, lines 45-50; col. 9, lines 19-25).

Applicant respectfully submits that Blouin does not teach or suggest Applicant's claims. In particular, because Blouin discloses an electrical route-set table, Blouin does not teach or suggest a database based on a set of one or more connectivity constraints. For example, claim 1, as amended, requires, "a plurality of wavelength division multiplexing access nodes of a network employing a source based scheme to establish communication paths, each of said plurality of access nodes building and maintaining a set of one or more network topology databases specific to that access node based on a set of one or more connectivity constraints, wherein network topology is the set of paths and wavelengths of possible communication paths from that access node to other nodes, wherein the wavelengths for each path are the set of wavelengths of each link of that path

that are available for establishing lightpaths on that path, and wherein said building and maintaining the set of one or more optical network topology databases includes building and maintaining a representation of the set of paths of possible communication paths."

Furthermore, claim 10, as amended, requires, "a wavelength division multiplexing optical network including a plurality of access nodes each including, for each link connected to the access node, a link channel set representing at least certain wavelengths on that link available for establishing a lightpath, wherein a lightpath is a wavelength and a path, wherein the path of a given lightpath is a series of two or more nodes and links interconnecting them through which traffic is carried by the wavelength of that lightpath, wherein said series of nodes respectively starts and ends with a source node and a destination node, and a database representing conversion free connectivity for the access node to others of said access nodes using the wavelengths in said link channel sets, wherein the access nodes builds and maintains a representation of the path of the given the lightpath in the database specific to the access node and wherein said conversion free connectivity includes the paths and wavelengths of possible lightpaths having the access node as the source node and others of the access nodes as the destination node."

The above quoted limitations are not described or suggested by Blouin. While there are various uses for the invention as claimed, several such uses are discussed at paragraphs 0073-0086 of the specification as filed. Thus, while the invention is not limited to the uses discussed on these pages, it should be understood that Blouin does not enable these uses and the above quoted limitations do.

For at least these reasons, Applicant respectfully submits that the claims discussed above are allowable. The Applicant respectfully submits that the additional dependant claims are allowable for at least the reason that they are dependent on an allowable independent claim.

Claims 25-26, 28-34, 36-40, and 42 stand rejected stand rejected under 35 U.S.C. § 102(a) as being anticipated by Zhang et al., U.S. Patent No. 7,020,394. Applicant does not admit that Zhang is prior art and reserves the right to swear behind the reference at a later date. Nonetheless, Applicant respectfully submits that Zhang does not disclose each and every element of the invention as claimed in claims 25-26, 28-34, 36-40, and 42.

Zhang discloses updating an optical network topology in a distributed manner using standard routing protocols such as Open Shortest Path First (OSPF) or Intermediate Station – Intermediate Station (IS-IS) (Zhang, col. 6, 35-42). As is well-known in the art, these routing protocols build monolithic optical network topology databases that are the same for each access node and very large as they give a physical representation of the entire network. See, for example, paragraph 0016 in the Background section of Applicant's specification as filed.

Applicant respectfully submits that Zhang does not teach or suggest Applicant's claims. In particular, Zhang discloses using OSPF or IS-IS to build a large monolithic optical network topology databases. However, Zhang does not teach or suggest an optical network database that is specific to a given access node and is different from the optical network topology databases on other access nodes. For example, claim 25, as amended, requires, "a database to store a representation of available paths from the access node to others of said access nodes using the wavelengths in said link state database, wherein a path is a series of two or more nodes connected by links on which a common set of one or more wavelengths is available for establishing one or more lightpaths, wherein the database is different than other access nodes to be coupled in the wavelength division multiplexing optical network and wherein the access node builds and maintains the available paths represented in the database."

In addition, claims 31 and 37, as amended, requires "building and maintaining at an access node of an wave division multiplexing optical network a database specific to the access node based on a set of one or more connectivity constraints, wherein the building and maintaining includes building and maintaining a representation of a set of paths to other access nodes in the database."

The above quoted limitations are not described or suggested by Zhang. While there are various uses for the invention as claimed, several such uses are discussed at paragraph 0090 of the specification as filed. Thus, while the invention is not limited to the uses discussed on these pages, it should be understood that Zhang does not enable these uses and the above quoted limitations do.

For at least these reasons, Applicant respectfully submits that the claims discussed above are allowable. The Applicant respectfully submits that the additional dependant

claims are allowable for at least the reason that they are dependent on an allowable independent claim.

Rejections under 35 U.S.C. § 103(a)

Claims 6-7, 12-13, 20, and 27 stand rejected under 35 U.S.C. § 103(a) as being obvious in view of Ho and Golmie et al., "A Differentiated Optical Services Model for WDM Networks" (hereinafter "Golmie"). Applicant respectfully submits that the combination does not teach each and every element of the invention as claimed in claims 6-7, 12-13, 20, and 27.

Golmie discloses Golmie discloses "a QoS service model in the optical domain ... based on a set of optical parameters that captures the quality and reliability of the optical lightpath." (Golmie, Abstract.) An optical lightpath is "an optical communication channel, traversing one or more optical links, between a source-destination pair." (Golmie, Page 69, Left column.) An optical resource allocater handles the dynamic provisioning of lightpaths..." (Golmie, Page 72, Left column.) Golmie does not describe what type of databases are used, the content of these databases, or where a network topology database may be stored.

Applicant respectfully submits that the combination of Ho's access nodes with Golmie's QoS service model would not teach or suggest Application invention as claimed in claims 6-7, 12-13, 20 and 27. Claims 6-7, 12-13, 20 and 27 depend on independent claims 1, 10, 16, and 25. Independent claims 1, 10, 16, and 25 are directed towards building and maintaining representation of paths in a topology database (see above). Furthermore, as per above, Ho does not teach or suggest building and maintaining representation of paths of a topology database. In addition, because Golmie does not teach or suggest the type or content databases used, Golmie cannot teach or suggest an access node building and maintaining a topology database. Therefore, Applicant respectfully submits that the combination of Ho and Golmie do not render claims 1, 10, 16, and 25 obvious and claims 6-7, 12-13, 20, and 27 that depend from them.

Claims 6-7 and 12-13 stand rejected under 35 U.S.C. § 103(a) as being obvious in view of Blouin and Golmie. Applicant respectfully submits that the combination does not teach each and every element of the invention as claimed in claims 6-7 and 12-13.

Applicant respectfully submits that the combination of Blouin's network with Golmie's QoS service model would not teach or suggest Application invention as claimed in claims 6-7 and 12-13. Claims 6-7 and 12-13 depend on independent claims 1 and 10. Independent claims 1, 10, 16, and 25 are directed towards a database based on a set of one or more connectivity constraints (see above). Neither Blouin nor Golmie teach or suggest a database based on a set of one or more connectivity constraints. Therefore, Applicant respectfully submits that the combination of Blouin and Golmie do not render claims 1 and 10 obvious and claims 6-7 and 12-13 that depend from them.

Claims 9, 15, 23, and 29 stand rejected under 35 U.S.C. § 103(a) as being obvious in view of Ho and Pulkkinen et al., U.S. Pat. Pub. No. 2003/0172356. Applicant respectfully submits that the combination does not teach each and every element of the invention as claimed in claims 9, 15, 23, and 29.

Pulkkinen discloses centrally managing a distributed database through an object oriented interface (Pulkkinen, paragraph 0012). A gateway is provided between the distributed database system and the clients managing the objects in the system (Pulkkinen, paragraph 0013). The distributed database system is used by service management points to manage services implemented on an intelligent network, such implementing a private telephone exchange over a virtual private network (Pulkkinen, paragraphs 0002, 0019). Nonetheless, Pulkkinen does not disclose a network topology database.

Applicant respectfully submits that the combination of Ho's access nodes with Pulkinnen's central database management would not teach or suggest Applicant's claims 9, 15, 23, and 29. Claims 9, 15, 23, and 29 depend on independent claims 1, 10, 16, and 25, respectfully. Independent claims are directed towards building and maintaining paths of a topology database (see above). Furthermore, as per above, Ho does not teach or suggest building and maintaining paths of a topology database. In addition, because Pulkkinen does not teach or suggest a network topology database, Pulkkinen cannot teach

or suggest an access node building and maintaining a topology database. Therefore, Applicant respectfully submits that the combination of Ho and Pulkkinen do not render claims 1, 10, 16, and 25 obvious and claims 9, 15, 23, and 29 that depend form them.

Claims 16-19 and 21-24 stand rejected under 35 U.S.C. § 103(a) as being obvious in view of Blouin and Graves et al., U.S. Patent 6,741,572. Applicant does not admit that Graves is prior art and reserves the right to swear behind the reference at a later date. Nonetheless, Applicant respectfully submits that the combination of Ho and Graves does not disclose each and every element of the invention as claimed in claims 16-19 and 21-24.

Graves discloses a centralized network manager (labeled INM 20 in Figure 5B) downloading a network connectivity map to a contract manger for a router (Graves, Figure 5B, col. 12, lines 28-34). The router uses the downloaded network connectivity map to find end-to-end maps (Graves, *Id.*).

Applicant respectfully submits that the combination of Blouin's electrical switch/routers with Graves' centralized network manager would not teach or suggest Applicant's claims 16-19 and 21-24. In particular, neither reference teaches or suggests a database based on a set of one or more connectivity constraints. For example, claim 16, as amended, requires, each of a plurality of access nodes of a wave length division multiplexing optical network, tracking wavelengths for each link of the wave length division multiplexing optical network connected to that access node; each of said plurality of access nodes, building and maintaining a topology based on conversion free connectivity to others of said plurality of said access nodes, wherein the topology of each of said plurality of access nodes is different than others of said plurality of access nodes, and wherein the building and maintaining of the topology includes building and maintaining a set of paths to others of the plurality of access nodes; and responsive to a request for a communication path received by any one of said plurality of access nodes, that access node, selecting both a path through a set of one or more links of said optical network and a single wavelength available on everyone of said set of links based on said optical topology maintained in that access node, and causing allocation of said selected path and wavelength."

The above quoted limitations are not described or suggested by Blouin and/or Graves. While there are various uses for the invention as claimed, several such uses are discussed at paragraphs 0073-0086 of the specification as filed. Thus, while the invention is not limited to the uses discussed on these pages, it should be understood that Blouin and/or Graves does not enable these uses and the above quoted limitations do.

For at least these reasons, Applicant respectfully submits that the claims discussed above are allowable. The Applicant respectfully submits that the additional dependant claims are allowable for at least the reason that they are dependent on an allowable independent claim.

Claims 31-34 and 36 stand rejected under 35 U.S.C. § 103(a) as being obvious in view of Ho and Sichani et al. ("A Novel Distributed Progressive Reservation Protocol for WDM All-Optical Networks, IEEE International Conferences Communication, ICC '03, 11-14 May 2003). Applicant respectfully submits that the combination does not teach each and every element of the invention as claimed in claims 31-34 and 36.

Sichani discloses a progressive reservation protocol for establishing lightpaths in a wave division multiplex all-optical network (Sichani, Abstract). Based on an existing topology, two basic types of reservation protocols can be used to reserve lightpaths: a forward reservation protocol and a backwards reservation protocol (Sichani, p. 1463, 2nd column). In a forward reservation protocol, the source node decides on a route to the destination node and initiates a reservation (Sichani, p. 1463, 2nd column). The source node sends out a forward reservation signal to reserve a selected wavelength on all links along the desired path (Sichani, p. 1463, 2nd column). On the other hand, in a backwards reservation protocol, the source node sends a probe packet towards the destination node gathering information about available wavelengths (Sichani, p. 1463, 2nd column). When the probe packet reaches the destination node, the destination nodes selects one of the available wavelengths by reserving the inverse path back to the source node (Sichani, p. 1463, 2nd column – p. 1464, 1st column). The progressive reservation protocol is a modified backwards reservation protocol, where an interval time is defined that restricts sending successive reservation packets (Sichani, p. 1463, 2nd column – p. 1464, 1st

column). Nonetheless, because Sichani is directed towards reserving paths, Sichani does not disclose building and maintaining a network topology database.

Applicant respectfully submits that the combination of Ho's access nodes with Sichani's backwards reservation protocol would not teach or suggest Applicant's claims 31-34 and 36. The combination would have the access nodes reserving lightpaths with a progressive reservation protocol using a routing table that is defined offline. However, the combination does not disclose the access nodes building and maintaining a set of paths to other access nodes in a topological database. For example, claim 31, as amended, requires, "building and maintaining at an access node of an wave division multiplexing optical network a database specific to the access node based on a set of one or more connectivity constraints, wherein the building and maintaining includes building and maintaining a representation of a set of paths to other access nodes in the database; receiving, at the access node, demand criteria representing a request for a communication path; selecting a path from the set of paths and a wavelength on said path using the database for that node that is stored in said access node and that stores a representation of available paths and wavelengths from the access node to others of said access nodes in said optical network, wherein each path from the set of paths is a series of two or more nodes connected by links on which a common set of one or more wavelengths is available for establishing one or more lightpaths ...".

The above quoted limitations are not described or suggested by Ho or Sichani. While there are various uses for the invention as claimed, several such uses are discussed at paragraphs 0073-0086. Thus, while the invention is not limited to the uses discussed on these pages, it should be understood that Ho and/or Sichani does not enable these uses and the above quoted limitations do.

For at least these reasons, Applicant respectfully submits that the claim 31 above is allowable. The Applicant respectfully submits that the additional dependant claims are allowable for at least the reason that they are dependent on an allowable independent claim.

Claim 35 stands rejected under 35 U.S.C. § 103(a) as being obvious in view of Ho, Sichani, and Golmie. Applicant respectfully submits that the combination does not

teach each and every element of the invention as claimed in claim 35. Claim 35 depends from independent claim 31. Independent claim 31 is directed towards an access nodes building and maintaining topological database. As per above, none of Ho, Sichani, or Golmie teach or disclose access nodes building and maintaining a topological database. Therefore, Applicant respectfully submits that the combination of Ho, Sichani, and Golmie do not render claim 31 obvious and claim 35 that depend from it.

Claims 37-40 and 42 stand rejected under 35 U.S.C. § 103(a) as being obvious in view of Ho, Sichani, and Freeman et al. ("Telecommunications System Engineering", John Wiley & Sons, 1980, pp. 199-203). Applicant respectfully submits that the combination does not teach each and every element of the invention as claimed in claims 37-40 and 42.

Freeman discloses to store method steps as program memory for providing instructions to a controller or computer.

Applicant respectfully submits that the combination of Ho's access nodes, Sichani's backwards reservation protocol, and Freeman's program memory would not teach or suggest Applicant's claims 37-40 and 42. The combination would have the access nodes reserving lightpaths using a routing table that is defined offline, where the program is stored in memory. However, the combination does not disclose the access nodes building and maintaining topological database. For example, claim 37, as amended, requires, "…building and maintaining at an access node of an wave division multiplexing optical network a database specific to the access node based on a set of one or more connectivity constraints, wherein the building and maintaining includes building and maintaining a representation of a set of paths to other access nodes in the database; responsive to receiving, at the access node, demand criteria representing a request for a communication path, selecting a path from the set of paths and a wavelength on said path using the database for that node that is stored in said access node and that stores a representation of available paths and wavelengths from the access node to others of said access nodes in said optical network, wherein each path from the set of paths is a series of two or more nodes connected by links on which a common set of one or more wavelengths is available for establishing one or more lightpaths …"

The above quoted limitations are not described or suggested by Ho, Sichani, or Freeman. While there are various uses for the invention as claimed, several such uses are discussed at paragraphs 0073-0086. Thus, while the invention is not limited to the uses discussed on these pages, it should be understood that Ho, Sichani, and/or Freeman does not enable these uses and the above quoted limitations do.

For at least these reasons, Applicant respectfully submits that the claim 31 above is allowable. The Applicant respectfully submits that the additional dependant claims are allowable for at least the reason that they are dependent on an allowable independent claim.

Invitation for a telephone interview

The Examiner is invited to call the undersigned at 408-720-8300 if there remains any issue with allowance of this case.
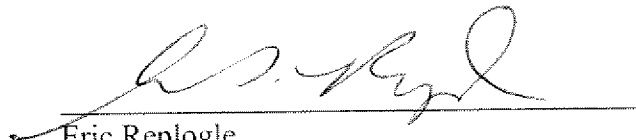
Charge our Deposit Account

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

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